

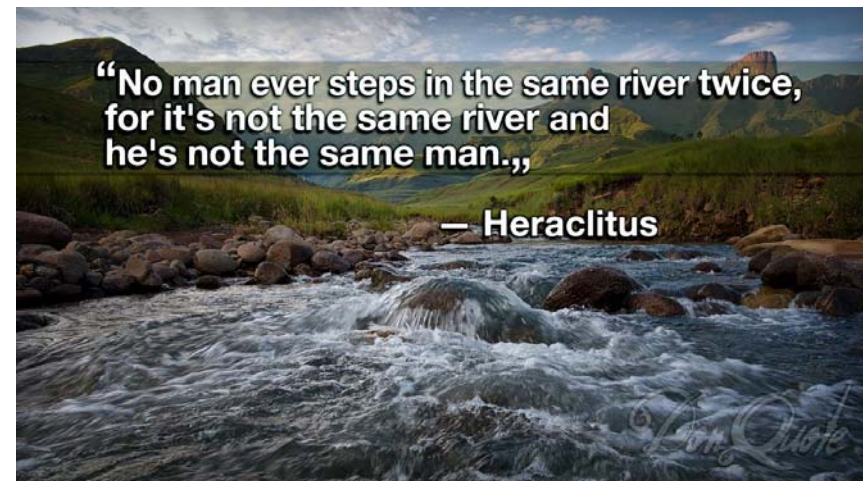
# Disruptive Forces in Healthcare

Don Campbell

# The future

“The future... is not a thing that lies before us.

It is the horizon of possibilities shaped in part by our actions in the present.”



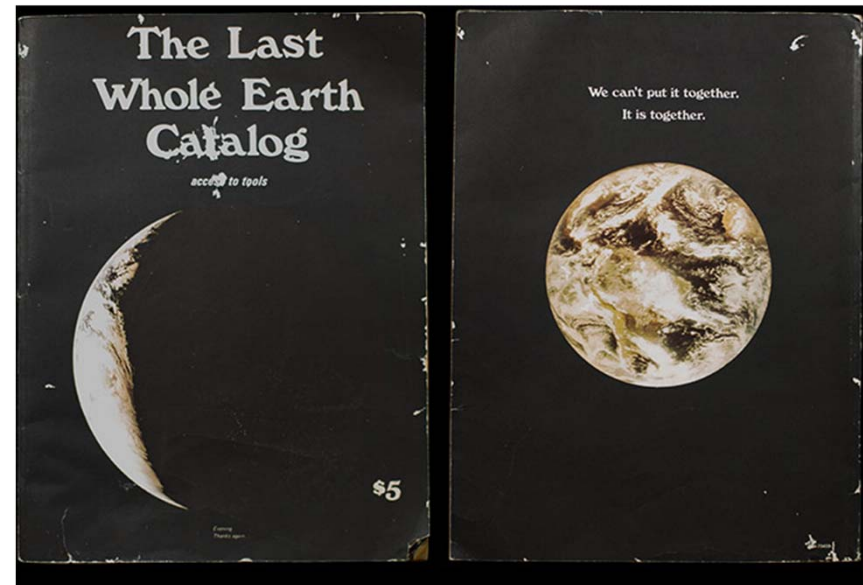
# The key issue in facing the future

How to assume the most advantageous orientation towards innovation?

Traditionally

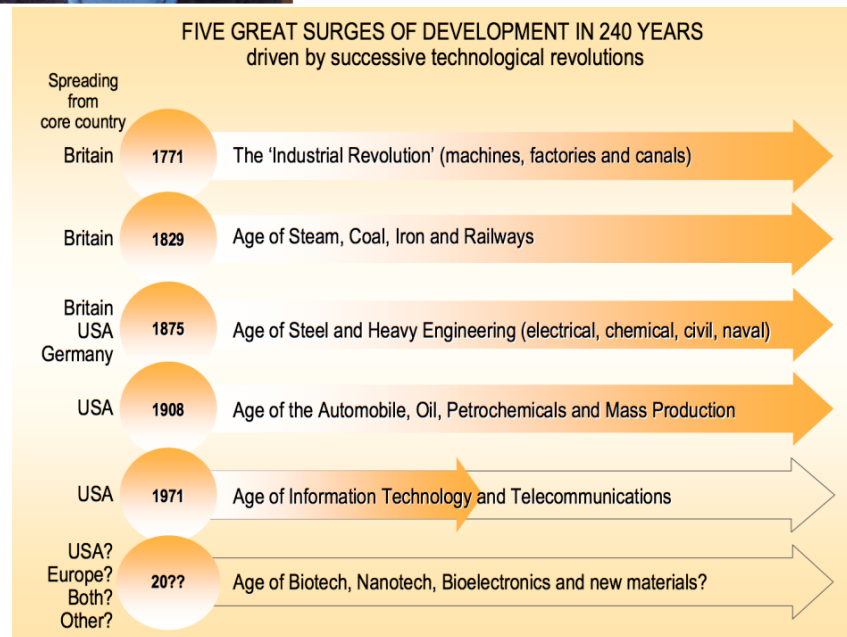
\* Science + Technology + Creativity = Innovation

Is there a different way to orient ourselves towards the future?





# Carlota Perez



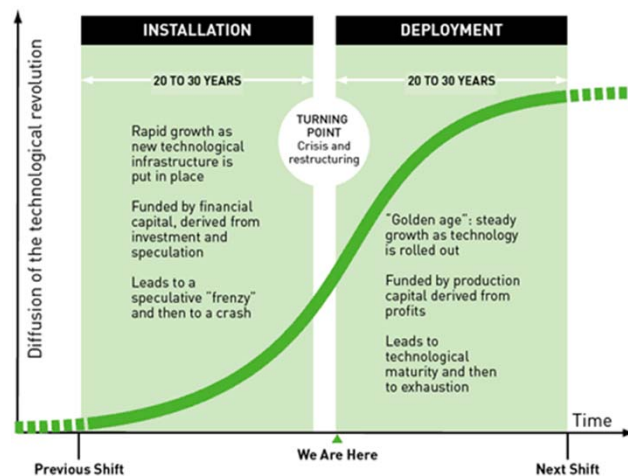
**Table 1. Five successive technological revolutions, 1770s to 2000s**

Technological revolution	Popular name for the period	Core country or countries	Big-bang initiating the revolution	Year
FIRST	The 'Industrial Revolution'	Britain	Arkwright's mill opens in Cromford	1771
SECOND	Age of Steam and Railways	Britain (spreading to Continent and USA)	Test of the 'Rocket' steam engine for the Liverpool-Manchester railway	1829
THIRD	Age of Steel, Electricity and Heavy Engineering	USA and Germany forging ahead and overtaking Britain	The Carnegie Bessemer steel plant opens in Pittsburgh, Pennsylvania	1875
FOURTH	Age of Oil, the Automobile and Mass Production	USA (with Germany at first vying for world leadership), later spreading to Europe	First Model-T comes out of the Ford plant in Detroit, Michigan	1908
FIFTH	Age of Information and Telecommunications	USA (spreading to Europe and Asia)	The Intel microprocessor is announced in Santa Clara, California	1971

# According to Perez

Exhibit 1: A 60-year Cycle of Capital

This pattern of investment and technological development has taken place five times since the early Industrial Revolution, according to historian Carlota Perez. The green arrow at the bottom shows our position in 2010: moving into a "golden age" of steady growth.



Source: Adapted from Carlota Perez, *Technological Revolutions and Financial Capital: The Dynamics of Bubbles and Golden Ages* (Edward Elgar Publications, 2003)

- First phase: Financial capital investment
- Financial crisis
- Second phase: Productive capital investment
  - Characterised by novel combination of existing technologies

# We shape our tools : Thereafter our tools shape us.

- All change in the era of the enlightenment has come about because of the fusion of ideas with new technology
- Lets look at how “they” put the digital camera in the iPhone



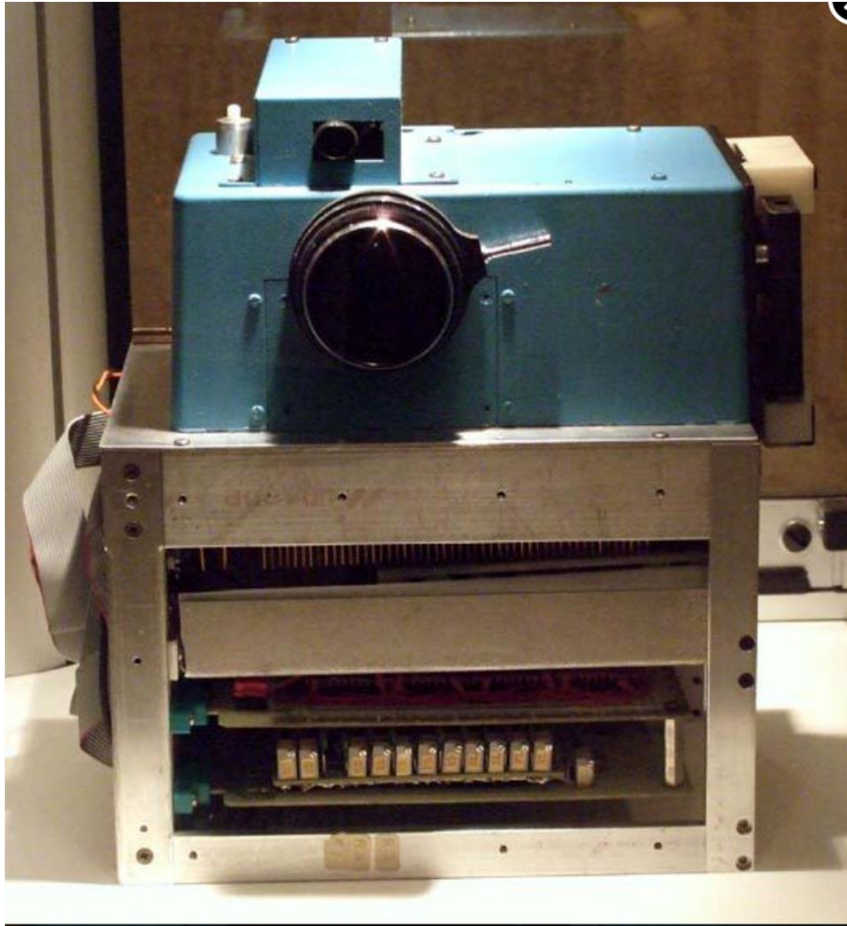


# Phillipe Kahn transmitted the first digital image via mobile phone 1997



"I wanted to create a 21st century version of a Polaroid picture"  
On June 11, 1997, an image of Kahn's new baby Sophie was transmitted.  
He attributes his inspiration to Claude Debussy.

# Steve Sasson invented the digital camera 1975



Kodak 1975:

“no one would ever want to look at their pictures on a television set,”



# Russell Kirsch 1957



- \* NBS 1957
- \* First digital scanner
  - \* “I wanted to take pictures of the moon as the space ship went past”
  - \* Photo of his baby son
  - \* 176X176 pixels
- \* Life Magazine 2003
  - \* One of the 100 most influential pictures that changed the world

# The digital camera in the first iPhone



“I’d like you to meet Raj. Raj Mehta.  
Raj put the digital camera in the iPhone”

Novel combination of existing technology

# WE are in the middle of a revolution

- Radically redesigning our services in combination with technology
- Capitalising on the ITC revolution
- What are the possibilities for healthcare
- What will drive it?



# What is the Future?

- \* “An open horizon that resists the illusion of predictability....
- \* Has no purpose or meaning other than the one we construct for it.”

“The biggest challenge is to develop new ways of thinking about the present and having a different disposition towards the future than we had  
(in the 1970’s).”





# Challenging Assumptions

Assumptions include:

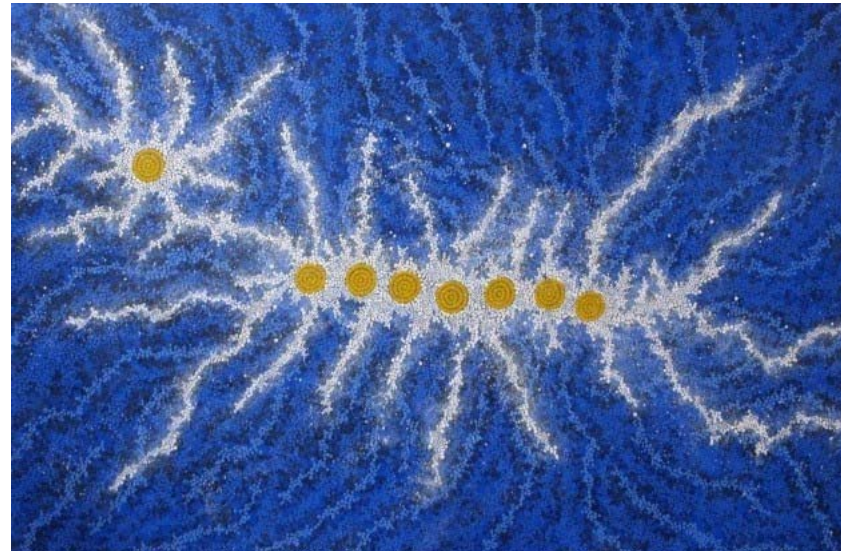
- Every observed effect has an observable cause
- The most complicated things can be understood by breaking down the whole into pieces and analysing it
- If we analyse past events sufficiently, this will help to predict future events.

Simplistic assumptions don't hold when we look at how groups of people interact and behave

Complex adaptive systems thinking challenges some of the assumptions that policy makers and planners take for granted.

# The call to arms

- \* Accept the challenge of adventure in good faith:
  - \* Change is accelerating
  - \* Planning doesn't seem to work anymore
- \* There is an ocean of contingencies and an unpredictable degree of surprise
  - \* Which we must navigate
- \* We must maintain an engaging disposition:
  - \* Cultivate networks and create conversation spaces.

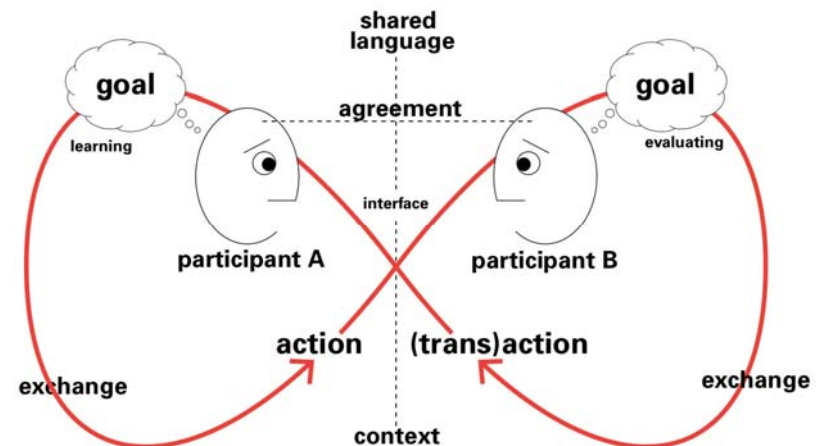




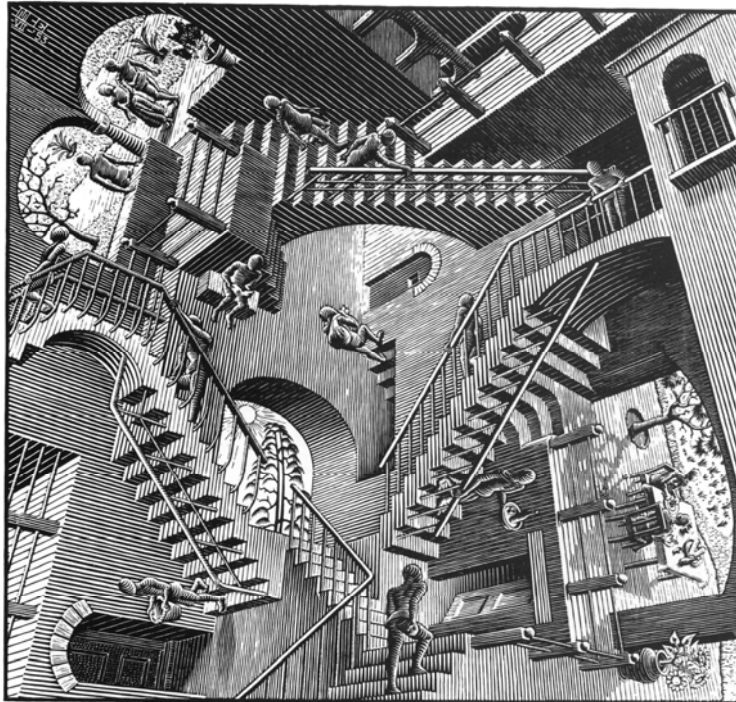
# Join the conversations that shape the future

“Great conversations that invent the worlds we inhabit don’t arise from problem solving.

Our connections in the world allow us to see new and different ways of dealing with our concerns.”



# Complexity and Connection



# The unintended consequences of abundant data

Abundant data

New kinds of connectivity

Complexity

Table 1. Relation of Dots to Links and to Patterns

Number of dots ( $N$ )	Number of possible links: $L = N(N - 1)/2$	Number of possible patterns: $P = 2^L$
4	$L = 6$	$P = 64$
10	$L = 45$	$P = 35$ trillion
12	$L = 66$	$P = 73.8$ quintillion

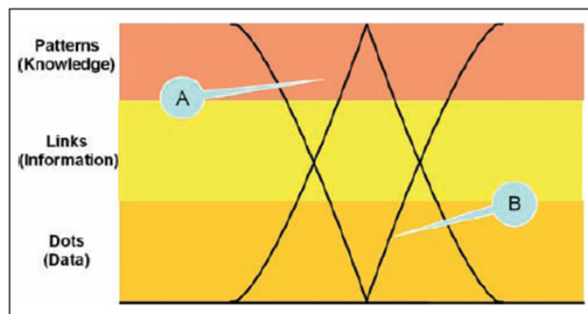
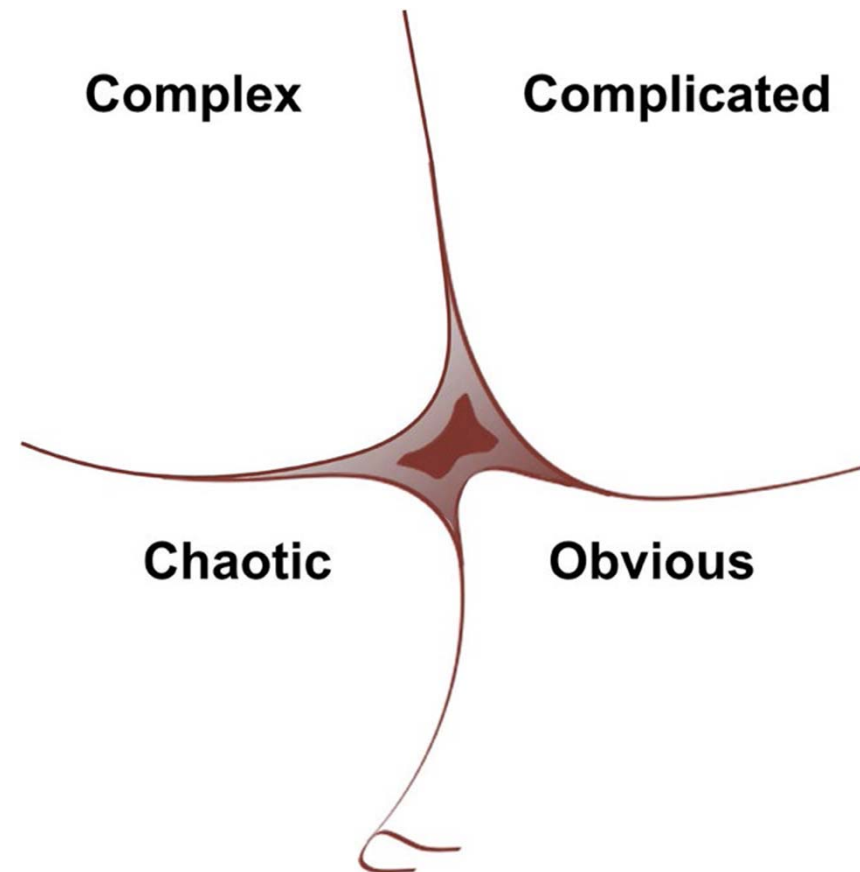
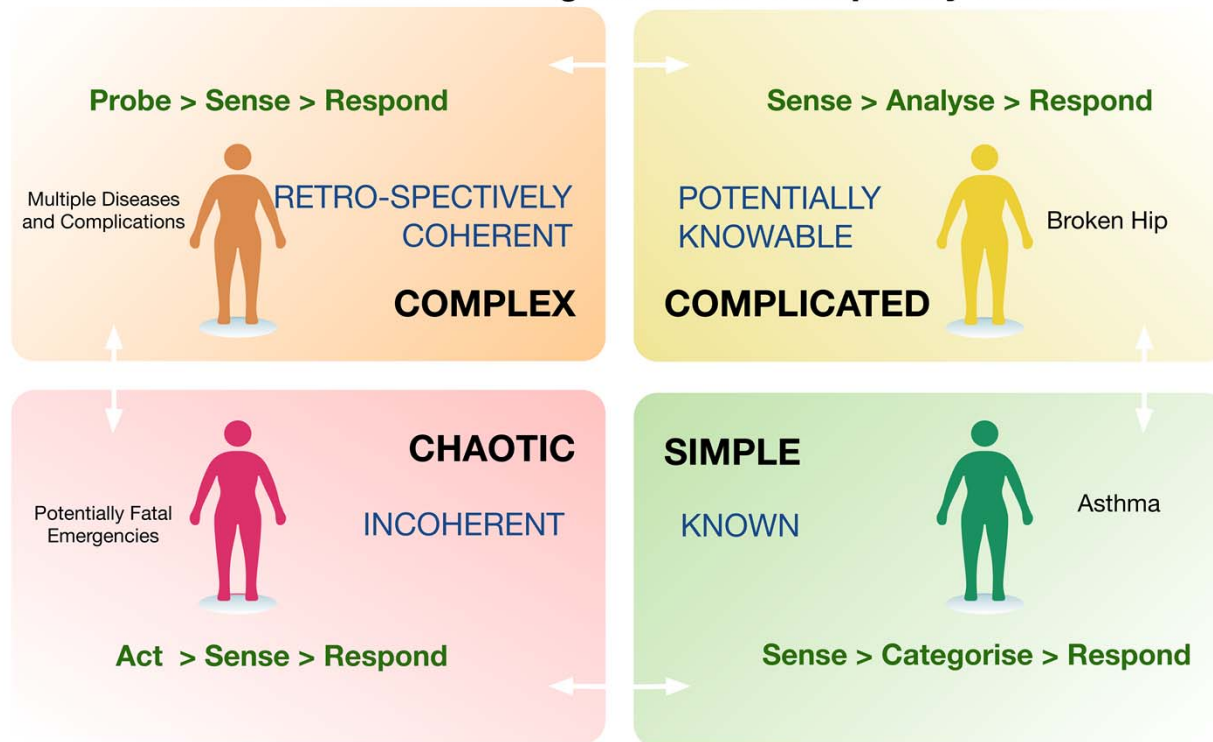


Figure 6. The pattern processing challenge



# Complexity in Healthcare

## Chronic Ill-Health Management via Complexity Science





# Sensemaking

We seek narratives to explain what we see as imaginable futures as a choice from those that we see, that are most plausible to us.

## Dadirri – Listening to one Another



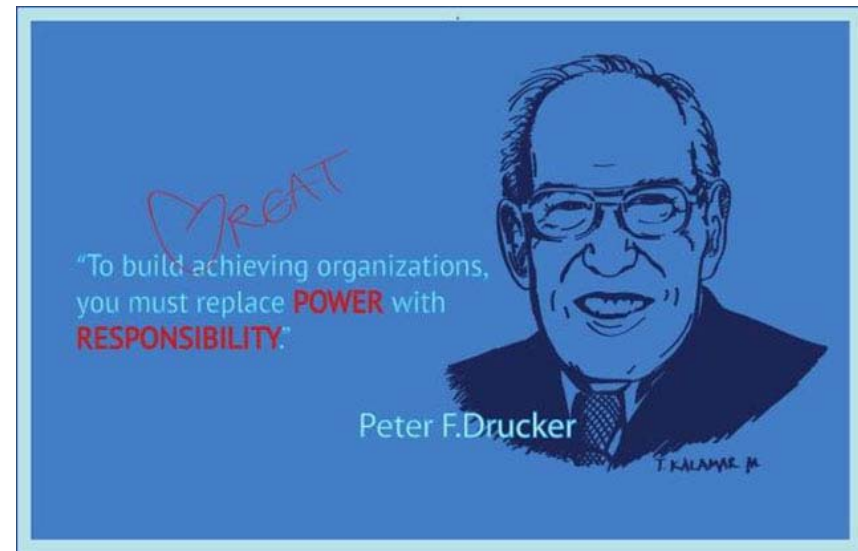
- Ngangikurungkurr - *dadirri* - listening to one another in contemplative - reciprocal relationships.
- Pitjantjatjara - *kulini* (listening), or *pulgkara kulin tjugku* (really (deep) listening, and wanting to listen).
- Bundjalung - *gan'na* hearing, listening, feeling, thinking, understanding.
- Gunmbayngirr - *junga-ngarraanga miinggi* - hearing, learning, understanding, knowing from the heart.

Artwork: Christopher Edwards Haines 2004

# What job do we want healthcare to do?

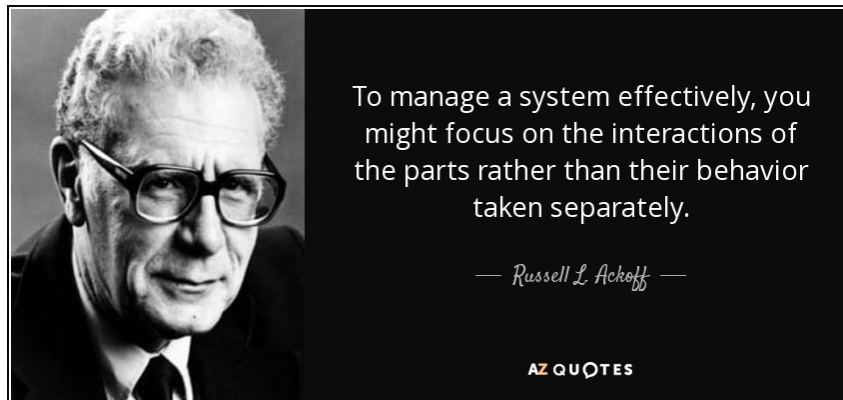
- The largest user-centric (service) industry on Earth
  - Currently operating on a non user-centric approach

“The hospital is the most complex human organization ever devised”  
(Peter Drucker)





# Systems thinking



In systems thinking, increases in understanding are believed to be obtainable by expanding the systems to be understood, not by reducing them to their elements. Understanding proceeds from the whole to its parts, not from the parts to the whole as knowledge does.

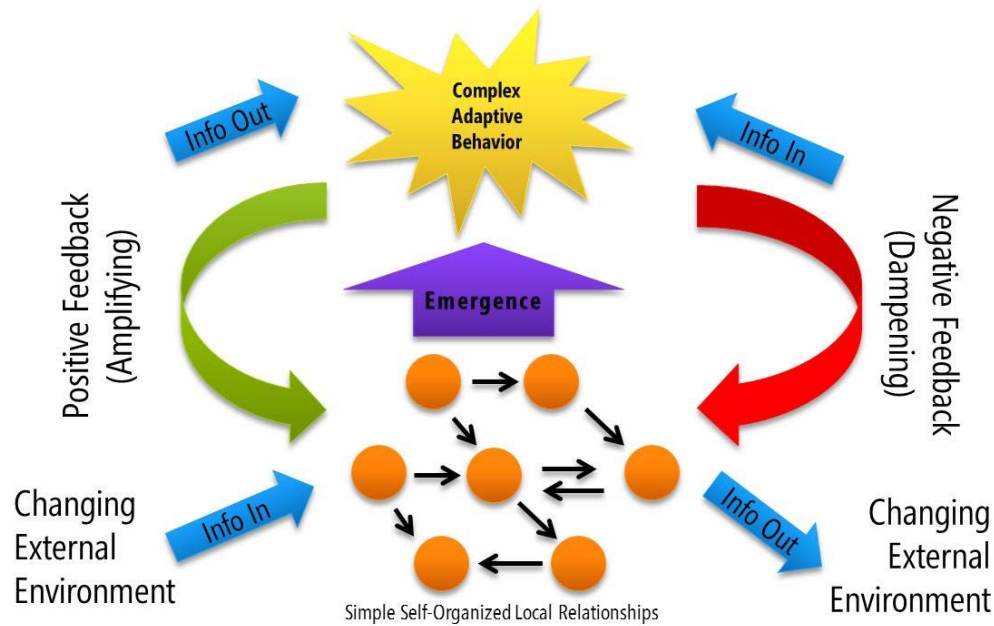
Russell L. Ackoff

QuoteAddicts.com

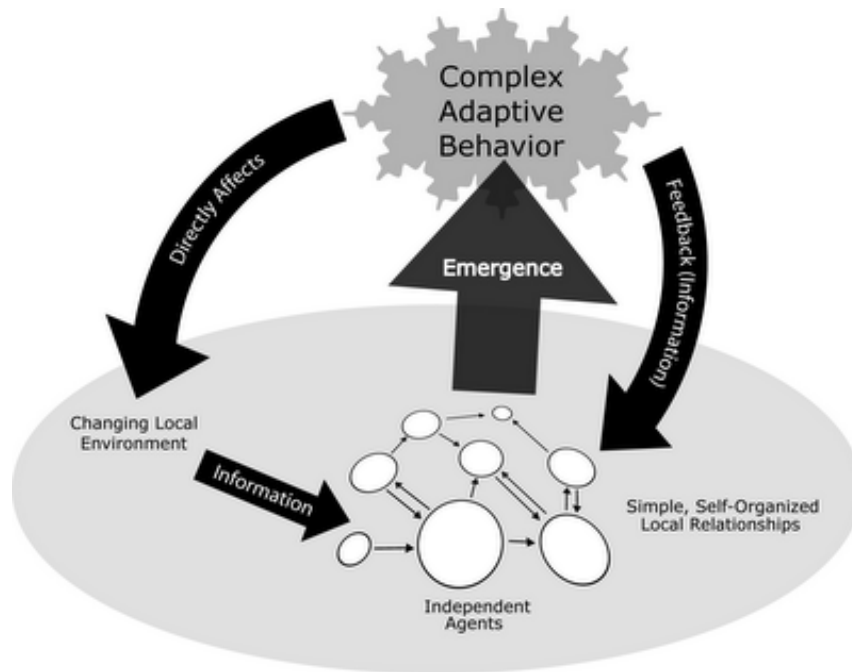
*“A system is more than the sum of its parts; it is an indivisible whole. It loses its essential properties when it is taken apart. The elements of a system may themselves be systems, and every system may be part of a larger system.”*

# Complex Adaptive Systems

- “a dynamic network of agents acting in parallel, constantly reacting to what the other agents are doing, which in turn influences behaviour and the network as a whole”

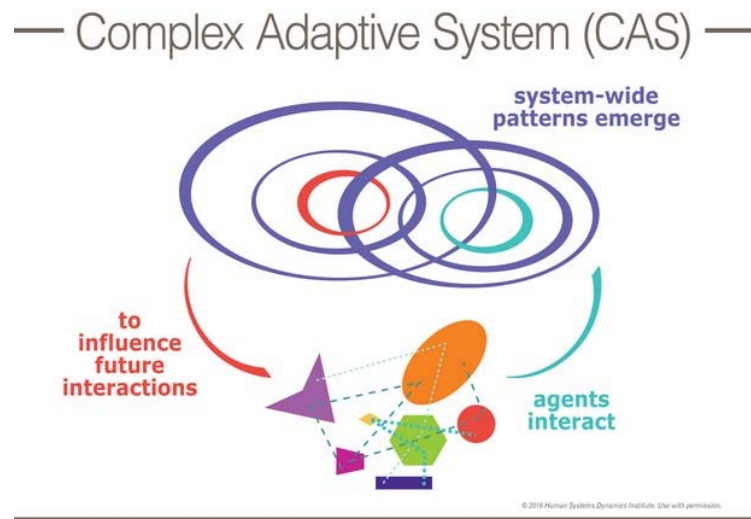


# Complex Adaptive Systems



- Control tends to be dispersed and decentralised
- Overall behaviour of the system is the result of many decisions made constantly by individual agents.
- Order emerges rather than being predetermined.
- It is not possible to reverse the system's history and the future is often unpredictable.

# Complex adaptive systems thinking



- Agents in any system are all the components of that system: interact and connect with each other in unpredictable and unplanned ways.
- All interactions within systems begin to form emerging patterns which in turn feed back into the system and further influence interactions of the agents.

# Disruption in health care

What will drive it?

- People
- Technology
- Workforce

Do we need new forms?

- \* Leadership and governance
- \* Organisations
- \* Services
- \* Professional roles and behaviours

# The big issues

- Aging
- Wealth disparity
- Increasing technological capability
- Climate change
- Focus on health(care) as an ecosystem:
  - A sustainable commons
- Manage complexity in healthcare



"The picture's pretty bleak, gentlemen. ... The world's climates are changing, the mammals are taking over, and we all have a brain about the size of a walnut."



# Safeguarding human health in the anthropocene epoch

- \* *“Health is a state of compete physical and mental well being and not merely the absence of disease and infirmity.*
- \* *Planetary health is the health of human civilisation and the state of the natural systems upon which it depends.” (WHO).*



The Lancet/ Rockefeller Foundation.

# Safeguarding human health in the anthropocene epoch

The report identifies three categories of challenge:

- \* **Imagination challenge** due to conceptual and empathy failures,
- \* **Research and Information challenge** due to knowledge failure, and
- \* **Governance challenges** due to failure to implement responses when faced with threat or uncertainty.

\*



ReThink  
Health

ReSearch • ReConnect • ReDesign

# What is the best way to deal with all this?

- Refame
- Cooperate/collaborate/communicate
- Co Design
- Disruptive Innovation
- Low paid workers/informal workers/Generalists
- Focus on adding value
- Treat healthcare as a commons in the age of complexity in the Anthropocene era

# How? Design

- In the post – enlightenment era
- Create desired future states
- Change the nature of organisations
- See through fresh eyes
- Professionals tasks will change
- We are moving from the techno-enlightenment era
- To the era of systemic design
  - ITC plus service

# Design

“Science is about what is  
Design is about what  
could be”

Everyone designs who  
devises courses of action  
aimed at changing existing  
conditions into preferred  
ones.



Tim Brown IDEO

# Sensemaking

- Design depends on stance and perspective
- Framing is important
  - Determines what you see and the perspective you place on it
- This determines what meaning you give to what you see











# Living in a digital world

More data: more patterns

More complexity

- \* How to manage this:  
create information
- \* How to create/use  
knowledge?

How to manage  
complexity in tumultuous  
environments?

- \* Cooperate/collaborate
- \* Conversation to build  
trust

How to  
manage/understand  
organisations?

# Skills and Tools needed

Technical skills can be acquired in different ways

- \* Data and analytics
- \* Language skills
- \* Visual display

Design thinking

- A practical methodology for creating new things and services

We need community

- \* Groups of people
  - \* Work together to identify novel linkages between existing technology
  - \* Generate better insights

Entrepreneurship training

- \* Small groups will be the basis of innovation



# What is design thinking?

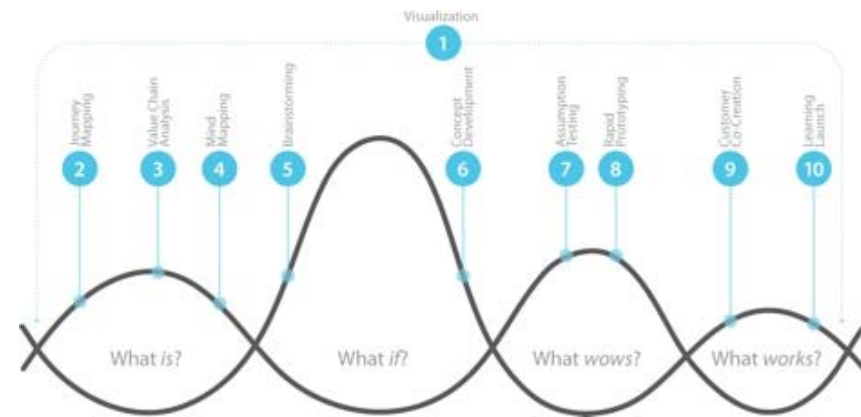
A problem solving method suited to wicked problems

- Human centred
- Possibility focused
- Hypothesis driven

Combines empathy, immersion in context, creativity, and an experimental approach

# Design Thinking

- Invites collaboration and engagement
- Creates a solution space
- Uses a structured method:
  - Move from understanding through ideation to finally create a desired future state
  - Repeat



# Why does (design) thinking matter?

- How we think determines the methods we use which determines the results we get
- Design thinking reframes conversation

